

AMENDMENT AND RESPONSE

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Serial No.: 10/033,156

Filing Date: October 25, 2001

Attorney Docket No. 125.020US01

Title: SEALED NITRIDE LAYER FOR INTEGRATED CIRCUITS

REMARKS

Claims 19- 22 are withdrawn. Claims 1-18 are pending in this application.

Rejection Under 35 U.S.C. §102(e)

Claims 1, 2 and 4 were rejected under 35 U.S.C. §102(e) as being anticipated by Nordstrom et al. (Publication No. US 2001/0012655 A1). A 102 rejection requires a single reference teach every element of a claim in question.

Claim 1

In regards to Claim 1, applicant has amended Claim 1 to clarify the coverage of Claim 1. Claim 1 includes the step of "forming a second layer of nitride overlaying a first layer of nitride without any intervening layers between the first and second layers of nitride to form the sealing nitride layer." The Nordstrom et al. reference does not teach "forming a second layer of nitride overlaying a first layer of nitride without any intervening layers between the first and second layers of nitride to form the sealing nitride layer," as is disclosed and claimed in Claim 1 of the present application. Since, every aspect of Claim 1 of the present invention is not taught by the Nordstrom et al. invention, Applicant respectfully requests the withdrawal of the rejection of Claim 1 under 35 U.S.C. §102(e).

Moreover, since Claims 2-6 depend from and further define patentably distinct Claim 1, Applicant asserts that these claims are also allowable and respectfully requests the withdrawal of the rejection of Claims 2-6. Since dependant claims 2-6 are believed allowable for the above reasons, Applicant has not addressed some of the further rejections to the dependant claims but retains the right to address said rejections if a future response is necessary.

Claim 4

In regards to the rejection of dependant Claim 4 under 102(e), Claim 4 includes the limitation, "wherein, at least a portion of the first layer of nitride remains overlaying the oxide layer after the RIE etch is applied." The Nordstrom et al. reference does not teach "wherein, at

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least a portion of the first layer of nitride remains overlaying the oxide layer after the RIE etch is applied," as is claimed in dependant Claim 4 of the present invention. Please refer to Figure 25(b) of the Nordstrom et al. reference and in particular what is marked as field oxide layer 18 which is not covered by at least a portion of the first layer of nitride 34. Moreover, please refer to paragraph [0137] of the Nordstrom et al. reference where it states, "[t]he etching is stopped, when the surface regions of the field oxide layer 18 and of the silicon oxide layer 42 have been exposed." Since at least a portion of the first nitride layer 34 does not remain overlaying the oxide layer, the rejection of Claim 4 under 102(e) is improper and the Applicant respectfully request the withdrawal of rejection of Claim 4 under 35 U.S.C § 102(e).

Rejection Under 35 U.S.C. §103(a)

Claim 7

Independent Claim 7 was rejected under 35 U.S.C. 103(a) as being unpatentable over Nordstrom et al. A 103 rejection requires a *prima facie* showing that the art reference suggests or provides motivation to modify the reference to establish obviousness under 103. A *prima facie* showing of obviousness further requires that the prior art reference teach or suggest all of the claim limitations.

Claim 7 includes the element "forming a contact opening through the first layer of nitride and the oxide layer to expose a portion of the surface of the substrate." The Nordstrom et al. reference neither alone nor in combination teaches or suggests "forming a contact opening through the first layer of nitride and the oxide layer to expose a portion of the surface of the substrate," as is disclosed and claimed in Claim 7 of the present application. For example, please refer to Figure 25(a) of the Nordstrom et al. reference and in particular silicon oxide 42 overlaying the surface of the substrate of Figure 25(a). In addition, Claim 7 includes the element "using a reactive ion etch (RIE etch) without a mask on the substrate for a pre-determined amount of time to remove a portion of the second layer of nitride overlaying the surface of the substrate in the contact opening without removing the portions of the second nitride layer

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overlying the sidewalls of the contact opening, wherein the oxide layer is sealed by the first and second nitride layers." The Nordstrom et al. reference neither alone nor in combination teaches or suggests "using a reactive ion etch (RIE etch) without a mask on the substrate for a pre-determined amount of time to remove a portion of the second layer of nitride overlying the surface of the substrate in the contact opening without removing the portions of the second nitride layer overlying the sidewalls of the contact opening, wherein the oxide layer is sealed by the first and second nitride layers," emphasis added, as is disclosed and claimed in Claim 7 of the present application. For example, please again refer to Figure 25(a) of the Nordstrom et al. reference and in particular silicon oxide 42 overlying the surface of the substrate of Figure 25(a). Moreover, please refer the alternative embodiment in Figure 25(b) of the Nordstrom et al. reference and in particular disposable spacer oxide 148, silicon oxide 39 as well as filed oxide 18. Referring to paragraph [0137] of the Nordstrom reference it states "[t]he etching is stopped, when the surface regions of the field oxide layer 18 and of the silicon oxide layer 42 have been exposed." Hence, exposing the oxide layers 18 and 42 in the Nordstrom et al. reference is contrary to what has been disclosed and what is claimed in Claim 7 of the present application. As discussed in the specification, one of the purposes of the present invention is to seal an oxide layer with nitride layers to provide an effective ion barrier. See Paragraphs 0005, 0006 and 0027 of the present application. This is not the objective of Nordstrom et al. reference. See the objects of the invention as set out in the summary sections in paragraphs 0019-0027 of the Nordstrom et al. reference. Thus, there is no motivation or suggestion in the Nordstrom et al. reference to modify the reference to what is claimed in the present application since the Nordstrom et al. reference is addressing other problems than what the present application is addressing.

Furthermore, the applicant respectfully traverses the Examiners assertion that the Nordstrom et al. reference teaches "a contact opening is formed by RIE without a mask (page 13 of Reference, para [0140])...." Paragraph [0140] of the Nordstrom reference goes on to state, "the nitride layer 144 is etched away using the resulting oxide side strings as a mask The etching process is stopped, when the surface of the filed oxide region 18 and the silicon oxide layer 42 in the emitter opening has been exposed." Hence, the Nordstrom et al. reference uses an oxide side string as a mask and exposes oxide layers 18 and 42. As discussed above, this is

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not what is disclosed or claimed in Claim 7 of the present application. Accordingly, the Nordstrom et al. reference does not teach or suggest every element of Claim 7 as pointed out above, the rejection of Claim 7 under 35 U.S.C. 103(a) is improper.

Moreover, since Claims 8-13 depend from and further define patentably distinct Claim 7, Applicant asserts that these claims are also allowable and respectfully requests the withdrawal of the rejection of Claims 8-13. Since dependant claims 8-13 are believed allowable for the above reasons, Applicant has not addressed some of the further rejections to the dependant claims but retains the right to address said rejections if a future response is necessary.

Claim 14

Claim 14 was rejected under 35 U.S.C. §103(a) as being unpatentable over Nordstrom et al. Claim 14 includes the elements "implanting ions of a second conductivity type through the layer of nitride." The Nordstrom et al. reference does not teach or suggest "implanting ions of a second conductivity type through the layer of nitride." Although the Nordstrom et al. reference teaches implanting ions through an oxide layer to form device regions, see Figure 8 and paragraph 0098 of the Nordstrom et al. reference, there is no suggestion or motivation in the Nordstrom et al. to direct one to the use of a nitride layer instead of an oxide layer as is disclosed and claimed in Claim 14 of the present application. The use of a nitride layer in this manner furthers the objective of an oxide layer that is sealed by first and second layers of nitride. As discussed above, the Nordstrom et al. reference is not seeking this objective and therefore provides no suggestion or motivation to arrive at the elements claimed in Claim 14 of the present invention.

Moreover, Claim 14 also includes the element, "exposing the substrate to a reactive ion etch (REI etch) for a period of time ... so that the oxide layer remains sealed by the first and second layers of nitride." The Nordstrom et al. reference does not teach or suggest "exposing the substrate to a reactive ion etch (REI etch) for a period of time ... so that the oxide layer remains sealed by the first and second layers of nitride," as is disclosed and claimed in Claim 14 of the present application. Please refer to Figure 25(a) of the Nordstrom et al. reference and in particular silicon oxide 42 overlaying the surface of the substrate of Figure 25(a). Moreover,

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please refer the alternative embodiment in Figure 25(b) of the Nordstrom et al. reference and in particular disposable spacer oxide 148, silicon oxide 39 as well as field oxide 18. Referring to paragraph [0137] of the Nordstrom reference it states "[t]he etching is stopped, when the surface regions of the field oxide layer 18 and of the silicon oxide layer 42 have been exposed." Hence, exposing the oxide layers 18 and 42 in the Nordstrom et al. reference is contrary to what has been disclosed and what is claimed in Claim 14 of the present application. As discussed in the specification, one of the purposes of the present invention is to seal an oxide layer with nitride layers to provide an effective ion barrier. See Paragraphs 0005, 0006 and 0027 of the present application. This is not the objective of Nordstrom et al. reference. See the objects of the invention as set out in the summary sections in paragraphs 0019-0027 of the Nordstrom et al. reference. Thus, there is no motivation or suggestion in the Nordstrom et al. reference to modify the reference to what is claimed in the present application since the Nordstrom et al. reference is addressing other problems than what the present application is addressing.

Accordingly, Applicant respectfully requests the withdrawal of the rejection of Claim 14 under 35 U.S.C. § 103. Moreover, since Claims 15-18 depend from and further define patentably distinct Claim 14, Applicant asserts that these claims are also allowable and respectfully requests the withdrawal of the rejection of Claims 15-18. Since dependant claims 15-18 are believed allowable for the above reasons, Applicant has not addressed further rejections to the dependant claims but retains the right to address said rejections if a future response is necessary.

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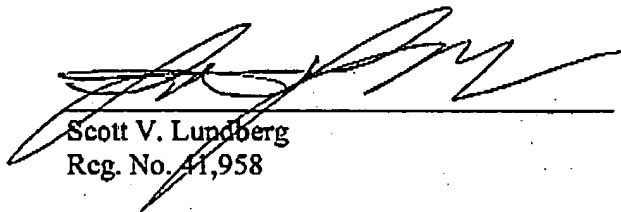
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CONCLUSION

Applicant respectfully submits that claims 1-18 are in condition for allowance and notification to that effect is earnestly requested. If the Examiner has any questions or concerns regarding this application, please contact the undersigned at (612) 332-4720.

If necessary, please charge and additional fees or credit overpayment to Deposit Account No. 502432.

Respectfully submitted,

Date: 10-7-03

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